

WHAT IS CLAIMED IS:

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1. A circuit for converting packets into an optical path signal, wherein said circuit is used in a transmission device for transmitting packets, said circuit comprising:

10 means for converting the packets into a plurality of data streams;

means for multiplexing the data streams; and

15 means for generating said optical path signal by adding at least one overhead to the multiplexed data streams.

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2. The circuit as claimed in claim 1, wherein said packets are IP packets which are used for realizing a communication by the Internet Protocol.

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3. A circuit for converting packets into an optical path signal which is used for wavelength division multiplexing (WDM) transmission, wherein said circuit is used in a transmission device for transmitting packets, said circuit comprising:

30 means for converting the packets into a plurality of data streams by using at least one data link layer process;

35 means for multiplexing the data streams by

using at least one interleaving process and for generating data which is a unit of said wavelength division multiplexing (WDM) transmission; and
means for generating said optical path
5 signal by adding at least one overhead which is necessary for said wavelength division multiplexing (WDM) transmission to the data.

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4. A circuit for converting an optical path signal into packets, wherein said circuit is used in a transmission device for transmitting
15 packets, said circuit comprising:
means for separating at least one overhead from said optical path signal;
means for generating data streams by demultiplexing data of said optical path signal
20 without the overhead; and
means for extracting the packets from the data streams.

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5. The circuit as claimed in claim 4, wherein said packets are IP packets which are used for realizing a communication by the Internet
30 Protocol.

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6. A circuit for converting an optical path signal which is used for wavelength division multiplexing (WDM) transmission into packets,

wherein said circuit is used in a transmission device for transmitting packets, said circuit comprising:

means for separating at least one overhead
5 which is necessary for said wavelength division multiplexing (WDM) transmission from said optical path signal;

means for generating data streams by
demultiplexing data of said optical path signal
10 without the overhead; and

means for extracting the packets from the data streams by using at least one data link layer process.

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7. A transmission device for transmitting packets, said transmission device comprising:

means for converting the packets into a optical path signal and for sending the optical path signal by using wavelength division multiplexing (WDM); and

means for converting the optical path
25 signal which is received into the packets.

30 8. The transmission device as claimed in claim 7, wherein said packets are IP packets which are used for realizing a communication by the Internet Protocol.

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9. A transmission device for transmitting packets, said transmission device comprising:

a first circuit comprising means for converting the packets into a plurality of data streams, means for multiplexing the data streams, means for generating an optical path signal by adding at least one overhead to the multiplexed data streams and means for sending the optical path signal by using wavelength division multiplexing (WDM); and

10 a second circuit comprising means for separating at least one overhead from said optical path signal, means for generating data streams by demultiplexing data of said optical path signal 15 without the overhead and means for extracting the packets from the data streams.

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10. A transmission device for transmitting packets by converting the packets into an optical path signal, said transmission device comprising:

25 packet mapping means for mapping a plurality of packets into an entire payload area of the optical path signal; and packet retrieving means for extracting said each packet from the payload area.

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11. The transmission device as claimed in claim 10, wherein said packets are IP packets which 35 are used for realizing a communication by the Internet Protocol.

12. A transmission system for transmitting
5 packets, said transmission system comprising:

a plurality of transmission devices each
of which comprises means for converting the packets
into an optical path signal and for sending the
optical path signal by using wavelength division
10 multiplexing (WDM), and means for converting the
optical path signal into the packets; and
means for establishing a connection
between said transmission devices by using the
optical path signal.

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13. The transmission system as claimed in
20 claim 12, wherein said packets are IP packets which
are used for realizing a communication by the
Internet Protocol.

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14. A transmission system for
transmitting packets by using wavelength division
multiplexing (WDM), said transmission system
30 comprising:

a plurality of transmission devices each
of which comprises: a first circuit including means
for converting the packets into a plurality of data
streams, means for multiplexing the data streams,
35 means for generating an optical path signal by
adding at least one overhead to the multiplexed data
streams and means for sending the optical path

signal by using wavelength division multiplexing (WDM); and a second circuit comprising means for separating at least one overhead from said optical path signal, means for generating data streams by
5 demultiplexing data of said optical path signal without the overhead and means for extracting the packets from the data streams; and
means for establishing a connection
between said transmission devices by using the
10 optical path signal.

15 15. A transmission system for transmitting packets, said transmission system comprising:
a plurality of transmission devices each of which comprises packet mapping means for mapping a plurality of packets into an entire payload area
20 of an optical path signal and packet retrieving means for extracting said each packet from the payload area; and
means for establishing a connection
between said transmission devices by using the
25 optical path signal.

30 16. The transmission system as claimed in claim 15, wherein said packets are IP packets which are used for realizing a communication by the Internet Protocol.

17. A method for converting packets into an optical path signal which is used for wavelength division multiplexing (WDM) transmission, wherein said method is used in a transmission device for 5 transmitting packets, said method comprising the steps of:

- converting the packets into a plurality of data streams by using at least one data link layer process;
- 10 multiplexing the data streams by using at least one interleaving process and generating data which is a unit of said wavelength division multiplexing (WDM) transmission; and
- 15 generating said optical path signal by adding at least one overhead which is necessary for said wavelength division multiplexing (WDM) transmission to the data.

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18. A method for converting an optical path signal which is used for wavelength division multiplexing (WDM) transmission into packets, 25 wherein said method is used in a transmission device for transmitting packets, said method comprising the steps of:

- separating at least one overhead which is necessary for said wavelength division multiplexing 30 (WDM) transmission from said optical path signal;
- generating data streams by demultiplexing data of said optical path signal without the overhead; and
- 35 extracting the packets from the data streams by using at least one data link layer process.

19. A circuit for converting packets into
5 a signal which is a transmission unit in a
synchronous digital transmission standard, wherein
said circuit is used in a transmission device for
transmitting packets, said circuit comprising:

means for converting the packets into a
10 plurality of data streams;

means for multiplexing the data streams
without adding any overhead for upper layer
transmission; and

means for generating said signal by adding
15 at least one overhead to the multiplexed data
streams.

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20. The circuit as claimed in claim 19,
wherein said packets are IP packets which are used
for realizing a communication by the Internet
Protocol.

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21. A circuit for converting packets into
30 an STM signal in SDH transmission, wherein said
circuit is used in a transmission device for
transmitting packets, said circuit comprising:

means for converting the packets into a
plurality of data streams by using at least one data
35 link layer process;

means for multiplexing the data streams by
using at least one interleaving process without

adding any overhead of a VC signal and for generating STM data which is a unit of said SDH transmission; and

5 means for generating said STM signal by adding at least one overhead which is necessary for said SDH transmission to the STM data.

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22. A circuit for converting a signal which is a transmission unit in a synchronous digital transmission standard into packets, wherein said circuit is used in a transmission device for 15 transmitting packets, said circuit comprising:

means for separating at least one overhead from said signal;

means for generating data streams by demultiplexing data of said signal without the 20 overhead; and

means for extracting the packets from the data streams.

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23. The circuit as claimed in claim 22, wherein said packets are IP packets which are used for realizing a communication by the Internet 30 Protocol.

35 24. A circuit for converting an STM signal in SDH transmission into packets, wherein said circuit is used in a transmission device for

transmitting packets, said circuit comprising:
means for separating at least one overhead
which is necessary for said SDH transmission from
said STM signal;

5 means for generating data streams by
demultiplexing data of said STM signal without the
overhead; and

10 means for extracting the packets from the
data streams by using at least one data link layer
process.

15 25. A transmission device for transmitting
packets, said transmission device comprising:

means for converting the packets into a
signal which is a transmission unit in a synchronous
digital transmission standard and for sending the
20 signal by said synchronous digital transmission; and
means for converting said signal into the
packets.

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26. The transmission device as claimed in
claim 25, wherein said packets are IP packets which
are used for realizing a communication by the
30 Internet Protocol.

35 27. A transmission device for transmitting
packets by using a transmission unit in a
synchronous digital transmission standard, said

transmission device comprising:

a first circuit comprising means for converting the packets into a plurality of data streams, means for multiplexing the data streams
5 without adding any overhead for upper layer transmission, means for generating a signal which is the transmission unit by adding at least one overhead to the multiplexed data streams and means for sending the signal by said synchronous digital
10 transmission; and
a second circuit comprising means for separating at least one overhead from said signal, means for generating data streams by demultiplexing data of said signal without the overhead and means
15 for extracting the packets from the data streams.

20 28. A transmission device for transmitting packets by converting the packets into an STM signal, said transmission device comprising:
 packet mapping means for mapping a plurality of packets into an entire section payload
25 area of the STM signal; and
 packet retrieving means for extracting said each packet from the section payload area.

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 29. The transmission device as claimed in claim 28, wherein said packets are IP packets which are used for realizing a communication by the
35 Internet Protocol.

30. A transmission system for
transmitting packets, said transmission system
5 comprising:

a plurality of transmission devices each
of which comprises means for converting the packets
into a signal which is a transmission unit in a
synchronous digital transmission standard, means for
10 sending the signal by said synchronous digital
transmission and means for converting said signal
into the packets; and

means for establishing a connection
between said transmission devices by using said
15 signal.

20 31. The transmission system as claimed in
claim 30, wherein said packets are IP packets which
are used for realizing a communication by the
Internet Protocol.

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32. A transmission system for
transmitting packets by using a transmission unit in
30 a synchronous digital transmission standard, said
transmission system comprising:

a plurality of transmission devices each
of which comprises: a first circuit including means
for converting the packets into a plurality of data
35 streams, means for multiplexing the data streams
without adding any overhead for upper layer
transmission, means for generating a signal which is

the transmission unit by adding at least one overhead to the multiplexed data streams and means for sending the signal by said synchronous digital transmission; and a second circuit including means 5 for separating at least one overhead from said signal, means for generating data streams by demultiplexing data of said signal without the overhead and means for extracting the packets from the data streams; and

10 means for establishing a connection between said transmission devices by using said signal.

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33. A transmission system for transmitting packets, said transmission system comprising:

20 a plurality of transmission devices each of which comprises packet mapping means for mapping a plurality of packets into an entire section payload area of an STM signal and packet retrieving means for extracting said each packet from the 25 section payload area; and

 means for establishing a connection between said transmission devices by using said STM signal.

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34. The transmission system as claimed in claim 33, wherein said packets are IP packets which 35 are used for realizing a communication by the Internet Protocol.

35. A method for converting packets into
5 an STM signal in SDH transmission, wherein said
method is used in a transmission device for
transmitting packets, said method comprising the
steps of:

10 converting the packets into a plurality of
data streams by using at least one data link layer
process;

15 multiplexing the data streams by using at
least one interleaving process without adding any
overhead of a VC signal and generating STM data
which is a unit of said SDH transmission; and
generating said STM signal by adding at
least one overhead which is necessary for said SDH
transmission to the STM data.

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36. A method for converting an STM signal
in SDH transmission into packets, wherein said
25 method is used in a transmission device for
transmitting packets, said method comprising the
steps of:

30 separating at least one overhead which is
necessary for said SDH transmission from said STM
signal;

35 generating data streams by demultiplexing
data of said STM signal without the overhead; and
extracting the packets from the data
streams by using at least one data link layer
process.